New Polyester Nanofiltration (NF) Membrane for Humic Acid Removal

Nurul Ain Jalanni[a], Mazrul Nizam Abu Seman[a], Che Ku Muhammad Faizal Che Ku Yahya[b]

[a]Faculty of Chemical Engineering and Natural Resources, Universiti Malaysia Pahang, Lebuhraya Tun Razak 26300 Gambang, Kuantan, Pahang, Malaysia

[b]Faculty of Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak 26300 Gambang, Kuantan, Pahang, Malaysia

ABSTRACT

Interfacial polymerization of a thin film composite (TFC) layer on top of a miroporous support membrane or other porous substrate is one of adequate method to form nanofiltration membrane in order to remove humic acid. Ultrafiltration (UF) polyethersulfone (PES) was used as membrane base support. Reaction occurred on the surface of membrane between two phase which are triethanolamine (TEOA) and trimesoyl chloride (TMC) as aqueous solution and organic solution respectively. Membrane that produced characterized by permeability, charged solutes rejection including salt solutions (NaCl and $Na_2SO_{4)}$ and humic acid removal. Properties of membrane can be attributed with the changes of monomer concentration and reaction time. Pure water flux J_w for membranes calculated as a function of applied pressure to membrane ΔP. Thus, flux increased linearly with operating pressure is applied to membrane where meets Hagen-Poiseuille equation and gradient of every straight line give pure water permeability data. The variation of reaction time (15, 25 and 35 min) at 8% (w/v) monomer concentrations can affect the properties of the membrane produced and decreasing water permeabilities. The rejection order of the membrane changed from 0.001 M Na_2SO_4 > 0.1M Na_2SO_4> 0.001M NaCl > 0.1M NaCl. Humic acid removal resulted almost fully rejection showed that nanofiltration membrane is one of the best methods in water treatment technology.

KEYWORDS: Humic Acid (HA); Interfacial Polymerization; Nanofiltration; Thin Film Composite

DOI: 10.4028/www.scientific.net/AMR.1107.383